

# **Document made available under the Patent Cooperation Treaty (PCT)**

International application number: PCT/US04/043375

International filing date: 22 December 2004 (22.12.2004)

Document type: Certified copy of priority document

Document details: Country/Office: US  
Number: 60/531,747  
Filing date: 22 December 2003 (22.12.2003)

Date of receipt at the International Bureau: 09 February 2005 (09.02.2005)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)



World Intellectual Property Organization (WIPO) - Geneva, Switzerland  
Organisation Mondiale de la Propriété Intellectuelle (OMPI) - Genève, Suisse

1278624

UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

*January 27, 2005*

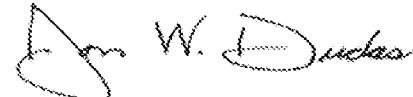
THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM  
THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK  
OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT  
APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A  
FILING DATE.

APPLICATION NUMBER: 60/531,747

FILING DATE: *December 22, 2003*

RELATED PCT APPLICATION NUMBER: PCT/US04/43375

Certified by



Under Secretary of Commerce  
for Intellectual Property  
and Director of the United States  
Patent and Trademark Office



17157 U.S.PTO

122203

Please type a plus sign (+) inside this box → 

PTO/SB/16 (02-01)

Approved for use through 10/31/2002. OMB 0651-0032  
Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

**PROVISIONAL APPLICATION FOR PATENT COVER SHEET**

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53 (c).

Express Mail Label No. EV395988801US

**INVENTOR(S)**

Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Mark Alan Matthew Robert	Schultz Lamb	Carmel, Indiana Westfield, Indiana

 Additional inventors are being named on the \_\_\_\_\_ separately numbered sheets attached hereto**TITLE OF THE INVENTION (280 characters max)****BIASED LENS MOUNTING FOR SEGMENTED DISPLAYS****CORRESPONDENCE ADDRESS**

Direct all correspondence to:

 Customer NumberPlace Customer Number  
Bar Code Label here

OR

Type Customer Number here

 Firm or  
Individual Name

JOSEPH S. TRIPOLI, THOMSON LICENSING INC.

Address

PATENT OPERATIONS.

Address

P. O. BOX 5312

City

PRINCETON

State

NJ

ZIP

08543-5312

Country

USA

Telephone

609-734-6834

Fax

609-734-6888

**ENCLOSED APPLICATION PARTS (check all that apply)** Specification Number of Pages CD(s), Number Drawing(s) Number of Sheets

Inclusive

 Other (specify) Application Data Sheet. See 37 CFR 1.76**METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT (check one)** Applicant claims small entity status. See 37 CFR 1.27. A check or money order is enclosed to cover the filing feesFILING FEE  
AMOUNT (\$) The Commissioner is hereby authorized to charge filing  
fees or credit any overpayment to Deposit Account Number: Payment by credit card. Form PTO-2038 is attached.The invention was made by an agency of the United States Government or under a contract with an agency of  
the United States Government. No. Yes, the name of the U.S. Government agency and the Government contract number are: \_\_\_\_\_.Respectfully submitted,  
SIGNATURE

TYPED or PRINTED NAME

Patricia A. Verlangieri

Date

REGISTRATION NO.  
(if appropriate)

Docket Number:

TELEPHONE 609 734-6867

**USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT**

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C., 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, D.C. 20231.

16018 U.S.PTO  
60/531747

122203

**1. Descriptive Invention Title:** Biased Lens Mounting for Segmented Displays**2. Inventor(s) Information** (The first named inventor should be the primary contact for Patent Operations)

<u>First Name</u>	Mark	<u>Middle Name</u>	Alan	<u>Last Name</u>	Schultz
<u>First Name</u>	Matthew	<u>Middle Name</u>	Robert	<u>Last Name</u>	Lamb

**Brief summary of the invention**

This invention provides a method to minimize distortion on segmented displays by varying the lens mounting on selected projectors to increase the quality of alignment in the more critical areas of the screen. Instead of every projector having the same lens mounting, each projector will have a lens mounting target based on where the projector is used in the segmented display.

**Background**

Distortion of all types create problems in aligning segmented displays. As the segments increase, the tradeoffs between seams get more difficult. This approach gives a method to help control the distortion on each lens to give an improvement in the overall picture. This shows a solution for the vertical direction while a similar solution is possible in two-dimensional arrays with both X and Y axis considerations.

When all of the projected images from segmented displays are perfect, the alignment is easy each segment. When lens, mirror, and screen distortions occur, the alignment becomes very complicated and tradeoffs must be made in the overall system response. Having the same lens and picture distortions on every projector may not deliver the best overall picture quality. Our approach is to use different types of distortion to our advantage.

**Description of the Invention**

**Each projector has a lens, a mirror, and a portion of the screen that the image is projected on. We find that if we start on one edge in aligning projectors, by the time we get to the opposite edge of the screen, the distortion is so great that we can no longer obtain a satisfactory alignment. Our demo is using a 4:1 matrix, which contains three seams. Each projector has the same lens and the same mirror structure but the distortion varies from projector to projector.**

**This invention proposes to align individual projectors differently depending on where they are located in the array. Individual projection distortions are biased toward a desired pattern to decrease the distortion found within the seam area where the distortion is most noticeable by increasing the distortion in on the outer edges where the distortion is less noticeable. The details can be explained in the figures.**

PU030326

Express Mail Label No. EV395988801US

Page 2 of 5

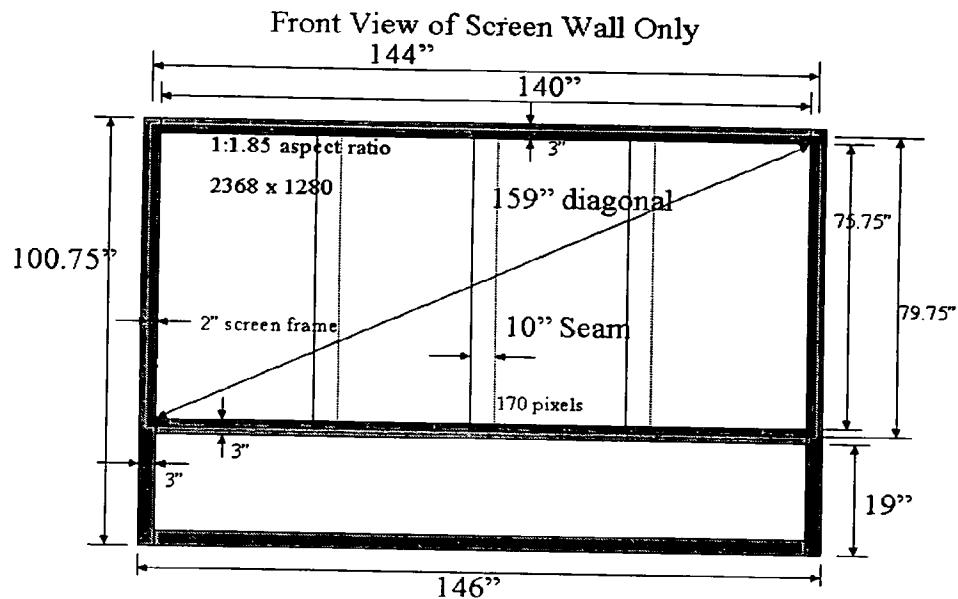


Figure 1

**Figures 1 – 3 show the segmented display setup made up of four vertically mounted 16:9 displays.**

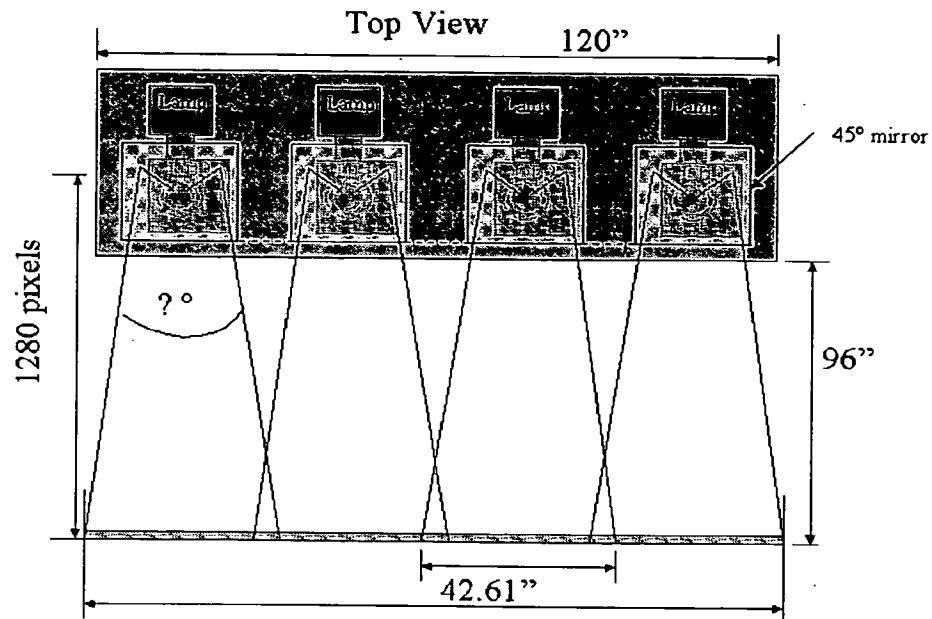


Figure 2

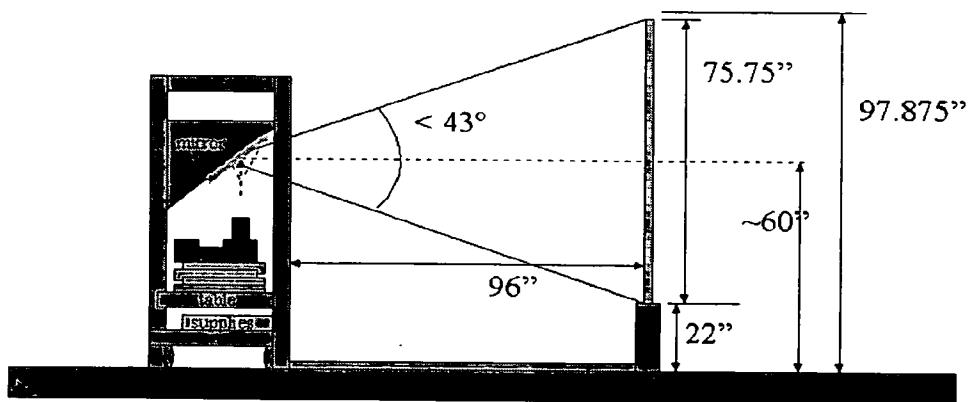
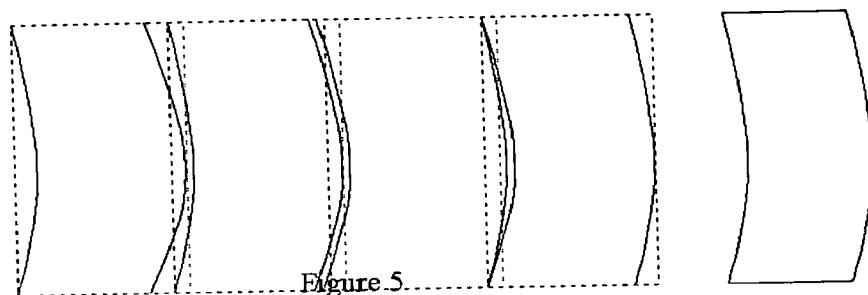
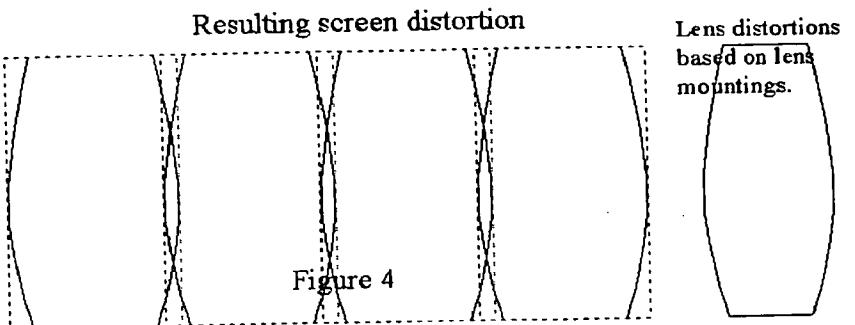
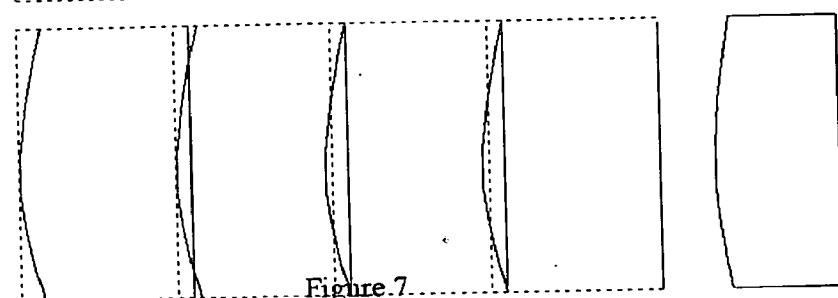
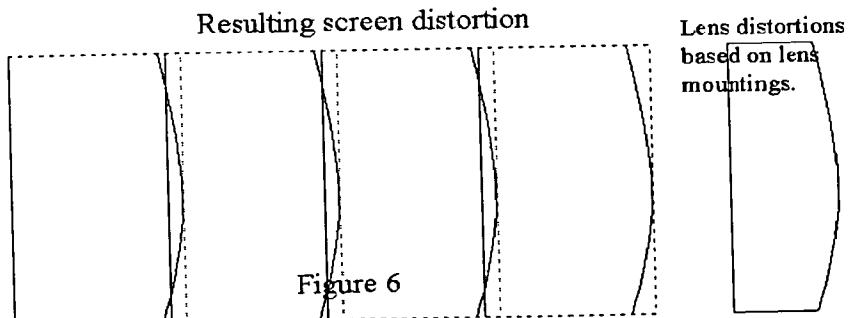
**Side View**

Figure 3



Figures 4-7 show typical distortions found on a single projector and the problems when trying to seam four projectors. The vertical and horizontal lines at the top become a problem in the seams. Some of this can be improved by using much more expensive optics but we hope our proposal delivers acceptable results using the lower cost lenses.



Some of these distortions are exaggerated to show the problems but all of them demonstrate the alignment issues found after all keystone problems have been corrected.

Our proposal is to align the projector on the left so that the right edge is as straight as possible where it is critical in the seam area as shown in Figure 6 and live with the left edge distortion since it is not very noticeable.

The two center projectors should be aligned to deliver a symmetrical distortion on each edge like Figure 4 since any alignment compromises to improve one side becomes a degradation on the other edge.

The projector on the right should be aligned to deliver a straight edge on the left side where it is critical in the seam area and live with the edge distortion on the right side where it is not very noticeable.

The result shown in Figure 8 is that the middle seam is unchanged but the two side seams have about 50 % of the original alignment distortion. The left and right edges will be worse but normally no one will even notice distortion on the edges.

